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(54) METHOD OF COATING POLYPROPYLENE MOLDING FOR BUMPER

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a method of costing a polypropylene molding for a bumper by which a metallic paint can be directly applied and a coating film excellent in weather resistance, chemical resistance and the like.

SOLUTION: As a metallic paint, an organic solvent type metallic paint containing resin components consisting of (A) a hydroxide group containing polyester resin, (B) a hydroxide group containing acrylic denatured chlorinated polyolefin resin, (C) cellulose acetate butylate and (D) a amino aldehyde resin and having their combining) ratios based on the total solid content of these four components being of 10-40 wt.% (A) component, 25-70 wt.% (B) component, 1-15 wt.% (C) component and 10-40 wt.% (D) component and containing a metallic pigment is used. Further, as a clear paint, a thermosetting clear paint whose the glass transition temperature of a hardened coating film is within the range of 60-80°C is used.

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1]A rate of bending flexibility 5,000 - 15,000 kg/cm^2 (20 **), A coefficient of linear expansion 8x10^{-5}-16x10^{-5}cm/cm/**, Are the method of painting a metallic paint directly to a polypropylene molding body for bumpers in within the limits whose heat deflection temperature is 80-130 **, and subsequently painting a clear coating material to it without painting a primer, and as this metallic paint, (A) Hydroxyl group content polyester resin, (B) hydroxyl group content acrylic modification chlorinated polyolefin resin, (C) It consists of cellulose acetate butylate and (D) amino aldehyde resin, And a resinous principle in which these rates of a compounding ratio are the (A) ingredient 10 - 40 % of the weight and the (B) ingredient 25 - 70 % of the weight and the (C) ingredient 1 - 15 % of the weight and 10 to 40 % of the weight of (D) ingredients based on the amount of sum total solid content of these four ingredients, A painting method of a polypropylene molding body for bumpers using a thermosetting clear coating material which uses an organic solvent type metallic paint containing metallic pigment, and is in within the limits whose glass transition temperature of the cured film is 60-80 ** as a clear coating material.
[Claim 2]The painting method according to claim 1 which is a two quart 1 baking method which paints a metallic paint, paints a clear coating material to the unhardened painted surface, and subsequently carries out heat cure of these both the coats simultaneously.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to a painting method with a new polypropylene molding body for bumpers.
[0002]
[Description of the Prior Art]From the former, many polyolefin resin molding bodies are used for the automobile shell, the exterior parts, for example, automobile bumper etc., etc. Since the surface of this resin does not have enough adhesion with a metallic paint film, after painting a chlorinated-polyolefin-resin system primer first, the metallic paint of a hydroxyl group content acrylic resin / a melamine resin system and the clear coating material of a hydroxyl group content acrylic resin / a melamine resin system are painted one by one.
[0003]However, a polyolefin system plastic-goods-molding object, especially the polypropylene molding body for bumpers are also received from viewpoints of saving resources, energy saving, etc. in recent years, without reducing coat performances, such as adhesion, Although development of the process of painting a metallic paint directly and subsequently painting a clear coating material is desired without painting a primer, the actual condition is that the practical coating method which fills this request is not established.
[0004]
[Problem(s) to be Solved by the Invention]The purpose of this invention skips a primer painting process, makes it possible to paint a metallic paint directly, and there is in providing the painting method of the polypropylene molding body for bumpers which can form the coat excellent in weatherability, chemical resistance, etc.
[0005]
[Means for Solving the Problem]As a result of inquiring wholeheartedly, by using a metallic paint of the following specific presentation especially etc., this invention person finds out that the above-mentioned purpose can be attained, and came to complete this invention.
[0006]A rate of bending flexibility this invention Namely, 5,000 - 15,000 kg/cm^2 (20 **), A coefficient of linear expansion $8x10^{-5}$-$16x10^{-5}$cm/cm/**, Are the method of painting a metallic paint directly to a polypropylene molding body for bumpers in within the limits whose heat deflection temperature is 80-130

**, and subsequently painting a clear coating material to it without painting a primer, and as this metallic paint, (A) Hydroxyl group content polyester resin, (B) hydroxyl group content acrylic modification chlorinated polyolefin resin, (C) It consists of cellulose acetate butylate and (D) amino aldehyde resin, And a resinous principle in which these rates of a compounding ratio are the (A) ingredient 10 - 40 % of the weight and the (B) ingredient 25 - 70 % of the weight and the (C) ingredient 1 - 15 % of the weight and 10 to 40 % of the weight of (D) ingredients based on the amount of sum total solid content of these four ingredients, A painting method of a polypropylene molding body for bumpers using a thermosetting clear coating material which uses an organic solvent type metallic paint containing metallic pigment, and is in within the limits whose glass transition temperature of the cured film is 60-80 ** as a clear coating material is started.

[0007]

[Embodiment of the Invention]Below, it explains still in detail about this invention.

[0008]The coated object in this invention is a polypropylene molding body for bumpers, and specifically, The rate of bending flexibility 5,000 - 15,000 kg/cm^2 (20 **), Preferably 10,000 - 14,000 kg/cm^2 (20 **), Coefficients of linear expansion are $8x10^{-5}$-$16x10^{-5}$cm/cm/** and a thing which is 80-130 ** in $8x10^{-5}$-$10x10^{-5}$cm/cm/** and heat deflection temperature within the limits of 100-110 ** preferably.

[0009]As this polypropylene molding body for bumpers, the homopolymer of propylene or the copolymer of propylene and ethylene is raised, for example. What mixed rubber compositions, such as ethylene-propylene rubber and ethylene butadiene rubber, 50 to 30% of the weight in 50 to 70 % of the weight of these polypropylene, In order to raise physical intensity furthermore, what mixed bulking agents, such as talc, five to 10% of the weight to polypropylene is included.

[0010]Although a metallic paint is directly painted in the method of this invention, without painting a primer to the above-mentioned polypropylene molding body for bumpers, it is preferred to wash the surface in alcohol etc. beforehand in advance of it.

[0011]The metallic paint used by this invention (A) hydroxyl group content polyester resin, (B) It consists of hydroxyl group content acrylic modification chlorinated polyolefin resin, (C) cellulose acetate butylate, and (D) amino aldehyde resin, And these rates of a compounding ratio are the organic solvent type metallic paints which contain the resinous principle which are the (A) ingredient 10 - 40 % of the weight and the (B) ingredient 25 - 70 % of the weight and the (C) ingredient 1 - 15 % of the weight and 10 to 40 % of the weight of (D) ingredients, and metallic pigment based on the amount of sum total solid content of these four ingredients.

[0012]The hydroxyl group content polyester resin (A) used for a metallic paint is obtained an esterification reaction or by carrying out an ester exchange reaction in polybasic acid and polyhydric alcohol.

[0013]As polybasic acid, for example Phthalic acid (anhydrous), isophthalic acid, terephthalic acid, (Anhydrous) Maleic acid, pyromellitic acid (anhydrous), trimellitic acid (anhydrous), (Anhydrous) Succinic acid, adipic acid, hexahydro (anhydrous) phthalic acid, hexahydro (anhydrous) isophthalic acid, Hexahydro (anhydrous) terephthalic acid, tetrahydro (anhydrous) phthalic acid, The compound which has 2-4 carboxyl groups or a carboxylic-acid-methyl-ester group can be mentioned into one molecule, such as sebacic acid, azelaic acid, dodecane dicarboxylic acid, dimethyl isophthalate, and dimethyl terephthalate.

[0014]As polyhydric alcohol, for example Ethylene glycol, propylene glycol, Neopentyl glycol, 1,6-

hexanediol, a diethylene glycol, The alcohol which has 2-6 hydroxyl groups can be mentioned into one molecule, such as triethylene glycol, trimethylolpropane, pentaerythritol, glycerin, and tricyclodecane dimethanol.

[0015]A hydroxyl value hydroxyl group content polyester resin (A) 20 - 200 mgKOH/g, desirable -- 30 - 150 mgKOH/g and acid value -- 0 - 80 mgKOH/g -- desirable -- 2 - 50 mgKOH/g and a number average molecular weight -- 1,000-30,000 -- within the limits of 2,000-20,000 is preferably suitable.

[0016]Hydroxyl group content acrylic modification chlorinated polyolefin resin (B) is obtained by carrying out the graft copolymerization of the monomer component containing a hydroxyl group content (meta) acrylic monomer, and the chlorinated polyolefins chlorinated at within the limits whose chlorine content is 5 to 50 % of the weight.

[0017]The monomer component which carries out copolymerization to chlorinated polyolefins contains the hydroxyl group content (meta) acrylic monomer, and this and a copolymerizable radical polymerization nature unsaturated monomer at least.

[0018]Before long as a hydroxyl group content (meta) acrylic monomer, For example, hydroxyethyl acrylate, hydroxyethyl methacrylate, The hydroxy alkyl ester of the carbon numbers 2-8 of acrylic acid, such as hydroxypropyl acrylate and hydroxypropyl methacrylate, or methacrylic acid is raised, and these can be used combining independent or two sorts or more. It is an ingredient for this thing carrying out a chemical reaction to amino aldehyde resin (C) which is a hardening agent, and making a bridge construction cured film form, Usually, it is preferred to blend so that it is necessary to contain in a monomer component by 3 to 20% of the weight of within the limits and the hydroxyl value of a copolymer may become the range of 20 - 150 mgKOH/g.

[0019]As the above-mentioned hydroxyl group content (meta) acrylic monomer and a copolymerizable radical polymerization nature unsaturated monomer, As long as it has an ethylene nature unsaturated bond (-C=C-) of radical polymerization nature, There are no restrictions in particular and The alkyl ester of acrylic acid publicly known from the former, or methacrylic acid. (For example, methyl of acrylic acid (meta), ethyl, propyl, butylester, etc.), Vinyl aromatic compounds (for example, styrene, vinyltoluene, etc.), unsaturated carboxylic acid (for example, acrylic acid (meta) etc.), glycidyl group content monomers (for example, glycidyl (meta) acrylate etc.), etc. are used.

[0020]The chlorinated polyolefins which carry out graft copolymerization to the above-mentioned monomer component are effective in raising adhesion with the polypropylene molding body for bumpers, etc., and, as for especially the chlorination percentage (chlorine content), it is preferred that it is 10 to 30% of the weight of within the limits five to 50% of the weight.

[0021]As a raw material of chlorinated polyolefins, polyolefines, such as polypropylene, the polybutene 1, the polypentene- 1, the methylpentene- 1, low density polyethylene, high density polyethylene, ethylene propylene rubber, and an ethylene-propylene-diene copolymer, are raised. Chlorinated polyolefins can be obtained by the ability to chlorinate with a conventional method by using such polyolefines as a raw material.

[0022]As for the graft copolymerization of the above-mentioned monomer component and chlorinated polyolefins, it is preferred to carry out by solution polymerization. It does not interfere, even if aromatic solvents, such as toluene and xylene, are the most preferred and otherwise use together an ester solvent, ketones, an alcohols solvent, a chlorinated solvent, an aliphatic series system solvent, an annular aliphatic

series system solvent, etc. as an organic solvent faced and used for performing this solution polymerization. As a polymerization initiator, a peroxide system initiator like benzoyl peroxide and an azo initiator like azobisisobutyronitrile can be used preferably. The quinone like hydroquinone can also be used as a terminator. Let it be a basic process to make it react, adding [dilute chlorinated polyolefins with a solvent suitably, as a polymerization method after adding an initiator, warm, and] a monomer component gradually.

[0023]Although what is necessary is just to determine suitably the blending ratio at the time of carrying out graft copolymerization according to the surface hardness of the coat for which it asks, abrasion resistance, surface gloss, etc., even if too large and too small, the good coat which balance was able to take is not obtained. Usually, a monomer component/chlorinated polyolefins = it is preferred to carry out copolymerization in [weight ratio] 30 - 90/10 - 70.

[0024](C) cellulose acetate butylate (henceforth "CAB") used as one of the resinous principles of a metallic paint is a cellulosic produced by butylester-izing the partial acetylation thing of cellulose further. By blending CAB, it becomes easy to carry out orientation of the metallic pigment in parallel to the painted surface, and the advantage that a metallic feeling improves is acquired. As CAB which can be conveniently used in this invention, generally the content of an acetyl group is 1 to 14 % of the weight preferably one to 30% of the weight, and, generally the content of a butyl group is 35 to 60 % of the weight preferably 16 to 60% of the weight.

[0025]Generally the viscosity at the time of measuring this CAB with the viscosity determination indicated to ASTM-D1343-54T (Formul A) goes into the range for 0.005 to 1 second preferably for 0.005 to 5 seconds.

[0026]it being the product concerning manufacture of U.S. Eastman Kodak Co., for example, a trade name, (the double figures of the former number ****** -- butyl group content (% of the weight) -- similarly, the triple figures show the amount of hydroxyl groups, and the latter number shows viscosity (second)), and specifically, The thing of grades, such as "EAB-171-2", "EAB-381-0.5", "EAB-381-2", "EAB-531-1", "EAB-551-0.2", and "EAB-551-0.01", can use it advantageously. Especially "EAB-381-0.5" from viewpoints of compatibility, viscosity, etc., "EAB-551-0.2", "EAB-551-0.01", etc. are preferred also in these.

[0027]As (D) amino aldehyde resin used for a metallic paint, As an amino ingredient, melamine, urea, benzoguanamine, acetoguanamine, One or more sorts and formaldehyde which were chosen from the group which consists of SUTERO guanamine, spiro guanamine, etc. are made to react, it methylol-izes, and what was further etherified by the monoalcohol of the carbon numbers 1-10 is raised. Among these, especially the thing that etherified melamine formaldehyde resin by low-grade monoalcohol is preferred.

[0028]The metallic paint used by this invention uses the resinous principle containing the above (A), (B), (C), and the (D) ingredient as the main vehicle component, and the percentage of each of these ingredients, It is based on the solid content total quantity of (A), (B), (C), and the (D) ingredient, (A) As for the (B) ingredient, 2 - the (D) ingredient of 30 - the (C) ingredient are [ingredient] 15 to 35 % of the weight ten to 40% of the weight 13% of the weight one to 15% of the weight 60% of the weight 25 to 70% of the weight 20 to 60% of the weight preferably ten to 70% of the weight. If the percentage of each ingredient comes out of this range, the purpose of this invention cannot be attained.

[0029]As metallic pigment in a metallic paint, publicly known aluminium powder, bronze powder, copper powder, the mica powder covered with titanium oxide, micaceous-iron-oxide powder, etc. are preferably

used from the former. The loadings of metallic pigment have per solid content 100 weight section of the above-mentioned resinous principle, and five to 20 preferred weight section.

[0030]In the metallic paint of this invention, the additive agent of a surface control agent, the catalyst for hardening promotion, a HAJIKI inhibitor, an ultraviolet ray absorbent, an antioxidant, a quencher, and others, etc. may be added if needed.

[0031]The metallic paint used by this invention can be prepared by mixing to an organic solvent, and dissolving thru/or distributing each above-mentioned ingredient. It can be used choosing suitably from the publicly known organic solvents for paints as this organic solvent. Specifically, a hydrocarbon system solvent, an alcohols solvent, an ester solvent, ketones, etc. are raised.

[0032]Thus, the metallic paint obtained is excellent in weatherability, chemical resistance (acid resistance, alkali resistance), the ease of carrying out of paint, painted-surface appearance, flexibility, a water resisting property, adhesion with the polypropylene molding body for bumpers, etc.

[0033]The clear coating material used by this invention is a paint which forms the transparent coating film painted to the painted surface of the above-mentioned metallic paint, is specifically using the vehicle component and the organic solvent as the essential ingredient, and it blends a color pigment, an extender, metallic pigment, etc. to such an extent that it does not check a transparent feeling if needed further.

[0034]The vehicle component in a clear coating material has a preferred thermosetting resin composition, and consists of base resin and a cross linking agent. It can be used choosing from publicly known resin suitably as base resin. An acrylic resin, polyester resin, polyurethane resin, etc. which specifically have at least one sort of cross-linking functional groups chosen from a hydroxyl group, an amino group, a block isocyanate group, a carboxyl group, an epoxy group, etc. in [two or more] one molecule are preferred. Melamine resin, a blocked polyisocyanate compound, a carboxyl containing compound, etc. which react to the above-mentioned cross-linking functional group, and can carry out bridge construction hardening as a cross linking agent are raised.

[0035]Especially if the above-mentioned vehicle component is mixed and it can dissolve thru/or distribute as an organic solvent, it will not be restricted, for example, solvents, such as aliphatic hydrocarbons, an aromatic hydrocarbons solvent, an alcohols solvent, an ester solvent, and ketones, are raised.

[0036]The clear coating material used by this invention is included at within the limits whose glass transition temperature of the heat cure coat is 60-80 **, and the chemical resistance of a coat, its pliability, etc. are good. Since chemical resistance will fall if glass transition temperature will be less than 60 **, and the flattery nature (pliability) to a substrate (coated object) will fall if 80 ** is exceeded conversely, neither is preferred.

[0037]Although the coating method of this invention is characterized by being a two quart painting method using the metallic paint and clear coating material of this application specification, it is preferred to paint by a two quart 1 baking method especially.

[0038]That is, this invention painting method is preferably enforced as following. First, alcohol etc. wash the surface of the polypropylene molding body for bumpers if needed, Subsequently, said metallic paint which adjusted coating viscosity to 15 to 20 seconds by Ford cup #4 (20 **) with the diluting solvent is painted so that dry membrane thickness may be about 15-25 micrometers directly in this polypropylene molding body side. Although it can be used choosing suitably from publicly known coating methods as a coating method in this case, it usually carries out by an air spray, airless spray, electrostatic coating, etc. Next, after

enforcing the above-mentioned coating method, the clear coating material which neglected it under several minute ordinary temperature, and adjusted coating viscosity with the organic solvent for dilution by Ford cup #4 (20 **) on the painted surface which is not hardened [the] at 15 to 20 seconds is painted so that dry membrane thickness may be set to about 15-30 micrometers. This coating method is similarly performed by the usual air spray, airless spray, electrostatic coating, etc. Next, after neglecting it under several minute ordinary temperature, heat for 20 to 40 minutes at 100-150 **, both these coats are made to harden simultaneously, and a two quart 1 baking coat is obtained.

[0039]

[Example]Hereafter, the example of manufacture, an example, and a comparative example are hung up, and this invention is explained much more concretely. Unless it refuses in particular, a "weight section" and "% of the weight" are meant a "part" and"%", respectively.

[0040]Example of manufacture 1 Calcium carbonate (talc) was blended with preparation polypropylene of the coated object, and the rate of bending flexibility obtained the polypropylene molding body $10x10^{-5}$cm/cm/** and whose heat deflection temperature 12,000 kg/cm^2 (20 **) and a coefficient of linear expansion are 105 **. This was made into the polypropylene molding body for bumpers, the surface was wiped with the gauze into which isopropyl alcohol was infiltrated, and it was made clarification, and was considered as the coated object.

[0041]Preparation (1) phthalic anhydride, hexahydro phthalic anhydride, the adipic acid, neopentyl glycol, 1,6-hexanediol, and trimethylolpropane of example of manufacture 2 metallic paint are used, By the usual method, the esterification reaction was performed and the xylene solution of hydroxyl group content polyester resin of Gardner viscosity T-W was obtained with 60% of solid content content. As for the hydroxyl value of this resin, 5 mgKOH/g and the number average molecular weight of 103 mgKOH/g and acid value are 2,900.

[0042]To 40 copies of chlorinated polypropylene (29% of chlorination percentage), (2) Hydroxyethyl methacrylate, 60 copies of monomer components which consist of methyl methacrylate and n-butyl methacrylate, Graft copolymerization was carried out under existence of benzoyl peroxide and in toluene, and solid content content obtained hydroxyl group content acrylic modification chlorinated polyolefin resin whose viscosity of a toluene solution is 1,300-1,700 cps/25 ** 40% at 40%. The hydroxyl values of this resin are 56 mgKOH/g.

[0043](3) The above-mentioned 60% hydroxyl group content polyester resin solution and the above-mentioned 40% hydroxyl group content acrylic modification chlorinated polyolefin resin are used, Based on a combination ingredient and loadings (part) given in the following table 1, mixture dispersion of these was carried out by DISUPA, and metallic paint (M-1) - (M-3) was prepared. The viscosity of the obtained metallic paint was adjusted to 17 seconds (Ford cup #4 / 20 **).

[0044]

[Table 1]

表 1

メタリック塗料記号	(M－1)	(M－2)	(M－3)
60%水酸基含有ポリエステル樹脂	42	48	55
40%水酸基含有アクリル変性塩素化ポリオレフィン樹脂	104	94	84
「EAB－381－0．5」	8	8	8
「ユーバン20SE」	42	42	42
「アルミペースト7680NS」	18	18	18
キシレン	18	18	18

[0045]"EAB-381-0.5" (the U.S. Eastman Kodak Co. make, trade name) is CAB for viscosity 0.5 second by 38% of butyl group content, 13% of acetyl group content, and ASTM-D1343-54T (Formul A) among the combination ingredients shown in Table 1. "You van 20SE" (the Mitsui Toatsu Chemicals, Inc. make, trade name) is 60% amino aldehyde resin (butyl-ized melamine resin solution). "Aluminium paste 7680NS" (the Toyo Aluminium K.K. make, trade name) is 65% aluminum metallic pigment.

[0046]On the coated object (polypropylene molding body for bumpers) surface obtained in Example 1 - the example 1 of 3 manufactures, - (M-3) was painted with the air spray so that above-mentioned metallic paint (M-1), direct, and dry membrane thickness might be set to 20 micrometers, and on it, it was set for 10 minutes at the room temperature. "SOFUREKKUSUNo.1611" (the Kansai Paint Co., Ltd. make.) adjusted to viscosity 17 seconds (Ford cup #4 / 20 **) [subsequently,] A trade name, the clear coating material for plastics which contains 70 copies of hydroxyl group content acrylic resins and 30 copies of butylated melamine resin of the number average molecular weight 17,000 by hydroxyl value 100 mgKOH/g, After the glass transition temperature of a cured film painted 65 ** with an air spray so that dry membrane thickness may be set to 30 micrometers, and it set it for 10 minutes at a room temperature, it was heated for 30 minutes at 120 **, and stiffened both coats simultaneously. The performance of the obtained coat was investigated with the following test method.

[0047]Test-method initial adhesion: After coat formation, using the cutter, as intersected perpendicularly at a time in 11, it cut deeply, and 100 grids with a size of 2 mm x 2 mm were made, the adhesion cellophane tape was stuck on the painted surface so that the painted surface might be arrived at at intervals of 2 mm at a base, and the painted surface after removing it rapidly was observed. O It is shown, respectively that exfoliation of a grid coat is not accepted at all, that exfoliation of 1-10 grid coats was accepted as for **, and that exfoliation of 11 or more grid coats was accepted as for x.

[0048]Water resisting property: The painted surface after a specimen is immersed in 40 ** warm water for 240 hours was observed. O As for x, it is shown, respectively that TSUYABIKE, blistering, adhesion degradation, etc. are not observed in the painted surface at all, that TSUYABIKE, blistering, adhesion degradation, etc. were observed in the painted surface for a while as for **, and that many TSUYABIKE, blistering, adhesion degradation, etc. were observed in the painted surface.

[0049]Acid resistance: Spot dropping of 0.2 cc of the sulfuric acid solution of 3% of concentration was carried out in the painted surface of the specimen, and the painted surface after neglecting it for 4 hours and rinsing by the temperature of 20 ** and 75% of humidity RH was observed. O It is shown, respectively that TSUYABIKE, blistering, etc. are not observed in the painted surface at all, that, as for **, TSUYABIKE, blistering, etc. were observed in the painted surface for a while, and that, as for x, many TSUYABIKE, blistering, etc. were accepted in the painted surface.

[0050]Alkali resistance: Spot dropping of 0.2 cc of the caustic soda solution whose concentration is 1% was carried out in the painted surface of the specimen, and the painted surface after neglecting it for 4 hours and rinsing by the temperature of 20 ** and 75% of humidity RH was observed. O It is shown, respectively that TSUYABIKE, blistering, etc. are not observed in the painted surface at all, that, as for **, TSUYABIKE, blistering, etc. were observed in the painted surface for a while, and that, as for x, many TSUYABIKE, blistering, etc. were accepted in the painted surface.

[0051]What is specified to weatherproof: "sunshine weatherometer and JIS B 7753" (sunshine carbon arc type weather meter) was used, and the painted surface and adhesion were observed after 1,200-hour progress. As for x, it is shown, respectively that, as for O, TSUYABIKE, blistering, etc. are not observed in the painted surface at all as for observation of the painted surface, that TSUYABIKE, blistering, etc. were observed in the painted surface for a while as for **, and that many TSUYABIKE, blistering, etc. were observed in the painted surface. Adhesion was performed like the above-mentioned initial adhesion.

[0052]The test result of the paint used and coat performance is shown in Table 2.

[0053]

[Table 2]

表 2

実施例		1	2	3
使用塗料				
メタリック塗料		(M－1)	(M－2)	(M－3)
クリア塗料		「ソフレックスNo. 1611」		
性能試験結果				
初期付着性		○	○	○
耐水性		○	○	○
耐酸性		○	○	○
耐アルカリ性		○	○	○
耐候性	塗面	○	○	○
	付着性	○	○	○

[0054]

[Effect of the Invention]According to this invention, a primer painting process can be skipped, a metallic paint can be painted directly, and the exceptional prominent effect that the painting method of the polypropylene molding body for bumpers which can form the coat excellent in weatherability, chemical resistance, etc. is provided is done so.

[Translation done.]